South Dakota Harmful Algal Bloom (HAB) Response Protocol and Assessment Strategy Recreation and Livestock Watering

"WHEN IN DOUBT STAY OUT"

Prepared by

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South Dakota Department of Agriculture and Natural Resources

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Introduction

Harmful Algal Blooms (HABs) can occur when toxin producing blue-green algae or cyanobacteria proliferate in a water body. Cyanobacteria blooms are most common in South Dakota (SD) lakes and streams during the recreation season (May 1st – September 31st). Blooms are expected to be most prominent during the warm summer months of July, August and early September commonly defined as the HABs season. Cyanobacteria blooms are generally associated with nutrient enrichment common in prairie lakes, small aging reservoirs, and other productive water resources in South Dakota.

Toxin producing algae blooms can have a serious impact on aquatic life and human health. Fish communities can be affected directly by cyanotoxins and indirectly from degrading bloom biomass which can reduce essential dissolved oxygen concentrations. Recreation activity in HABs prone waters increases the risk of human exposure to cyanotoxins. Human health impacts from cyanotoxin exposure can range from a small rash to shortness of breath and in serious cases kidney and liver damage. The magnitude of the health impact is dependent on type of cyanotoxin, concentration level and exposure detail.

Toxin producing algae blooms can also impact wildlife, domestic pets, and livestock health. Many wildlife species are inadvertently exposed to HABs when relying on waterbodies for habitat requirements. Domestic pets become vulnerable when swimming and drinking in HAB infested waters. Livestock are particularly at risk when primary drinking sources are prone to HABs. Animal symptoms range from difficulty breathing to seizures and death. The health impacts are again dependent on cyanotoxin type, concentration level and exposure detail.

EPA Region VIII has strongly encouraged states to develop response plans to address the risks associated with human and livestock exposure to HABs. The Watershed Protection Program (WPP) has assumed the HABs response role for the SD Department of Agriculture and Natural Resources. The goal of the WPP is to develop a partnership-based response protocol to mitigate risk and impacts of HABs on recreation and livestock watering in SD. The state HABs response includes four key elements.

Key elements of South Dakota's HAB response:

- Communication
- Partnerships
- Information and outreach
- Decision process

Communication

Responding to HABs requires a diverse level of communication and coordination. The WPP assessment team appointed a HABs coordinator to facilitate communication and coordination with federal, state, and local organizations. Communication is essential to develop partnerships that expand resource capacity to address HABs in SD. The HABs coordinator communicates and coordinates with the following organizations:

- EPA Region VIII HABS team (EPA): EPA provides SD with guidance and resources for implementing a statewide HABs program.
- SD Game Fish and Parks (GFP): WPP provides GFP officials with HAB event notifications and available cyanotoxin results for managed waterbodies.
- SD Department of Health (DOH): WPP provides the state epidemiologist with documented HAB event notifications.
- SD State Veterinarian Office (SVO): WPP intends to notify the state Vet and SDSU Vet extension when potential and documented HABs events threaten livestock.
- Natural Resources Conservation Service (NRCS): WPP will forward producers to county NRCS offices for information about alternate water sources and USDA programs for HABs related livestock death reimbursement programs.
- County Emergency Managers (CEM): WPP will notify county emergency managers when HABs events are reported or documented in local water resources.
- East Dakota Water Development District (EDWDD): WPP will provide EDWDD staff with HABs event notifications and cyanotoxin results for waterbodies within district boundaries.
- James River Water Development District (JRWDD): WPP will provide JRWDD staff with HABs event notifications and cyanotoxin results for waterbodies within district boundaries.
- Lake Associations: WPP will provide HABs event notifications and cyanotoxin results to lake association presidents.

Tables 1 and 2 provide contact information for the various partners listed above. Communicating with members of the public is also a component of HAB response. The communication pathways for public HABs reports is described in the HABs response protocol section.

Table 1. Contact information for federal and state HAB partners.

Organization	Contact title	Contact Name	Contact Phone #	Contact email
EPA	HAB coordinator	Liz Rogers	303-312-6974	Rogers.liz@epa.gov
EPA	HAB coordinator	Tina Laidlaw	406-457-5016	Laidlaw.Tina@epa.gov
GFP	Aquatic Resource Chief	John Lott	605-773-4508	John.Lott@state.sd.us
GFP	Operation Manager	Al Nedved	605-773-4502	Al.Nedvedt@state.sd.us
DOH	State Epidemiologist	Dr. Joshua Clayton	605-773-3737	Joshua.Clayton@state.sd.us
SVO	State Veterinarian	Dustin Oedekoven	605-773-3321	aibmail@state.sd.us
SDSU vet	SDSU extension vet	Russ Daly	605-688-6589	Russel.Daly@sdstate.edu

Table 2. Web-based contact information for local HABs partners.

Entity	Webpage Address
NRCS county field offices	https://offices.sc.egov.usda.gov/locator/app?service=page/CountyMap&state=SD&stateName=South%20Dakota&stateCode=46
CEM-county specific	https://sdemergencymgmt.maps.arcgis.com/apps/SimpleViewer/index.html?appid=d1c7ab8f4a2e411484250925b1a31d22
EDWDD-Jay Gilbertson, Manager	https://eastdakota.org/
JRWDD-Dave Bartle, Manager	https://www.jrwdd.com/
Lake Associations-Lake specific	

Partnerships

HABs can be widespread and numerous in SD waters during the recreation season. HABs response requires a holistic partnership-based approach. HABs partnership includes collaboration between water resource managers, conservation agencies, public health officials, veterinarians, emergency managers, and local interest groups (Tables 1-2). The partnership provides a linkage to various aspects of the decision process required to mitigate risk and potential impacts of HABs. Partnership decisions may include but are not limited to:

- Public awareness tools and distribution
- Monitoring and assessment
- Advisory posting and beach closures
- Public health impact resolution
- Livestock and pet health impact resolution

The WPP assessment team will provide individuals and organizations technical assistance to monitor cyanotoxins in waterbodies of concern. Several partners have engaged in cyanotoxin monitoring in lakes in eastern SD (refer to HABs Assessment Strategy section). Information and outreach tools were also developed to enhance communication and facilitate partnership decisions.

Partners are encouraged to contact the HABs coordinator Josh Strobel (605-773-6710 or Josh.Strobel@state.sd.us) or WPP (773-4254) with questions concerning partnership collaboration.

Information and Outreach

Information and outreach tools were designed to generate HAB awareness and minimize human and livestock exposure to cyanotoxins in SD's water resources. The following information and outreach resources have been developed by WPP:

- HABs webpage and web map (https://denr.sd.gov/dfta/wp/habs.aspx) containing awareness information, cyanotoxin data and long-term HABs report records.
- Recreation based HABs brochures for distribution to specific HABs partners (i.e. GFP) and other pertinent sources (i.e. health care facilities).
- Livestock and pet based HABs brochure for distribution to pertinent HAB partners, local veterinarian offices, feed stores, implement dealers and other agricultural sources to target livestock producers.

Additional information and outreach tools will be developed by WPP and various partners over time. The following describes ideas for future information and outreach through collaborative partnerships to further minimize human, pet and livestock exposure to HABs:

- Press releases
- Social media posts
- HAB advisory process
- Beach closure process

Decision Process

A response protocol was developed to provide water resource managers with a framework to address HAB reports from the public. The response protocol incorporates the four key elements. The response structure is based on anticipated scenarios from past HAB reports received by the Department of Agriculture and Natural Resources (DANR). The structure also accounts for potential situations where health impacts are identified and require immediate action. The decision process may change as new experiences are encountered following each HABs season. The protocol requires participation from different partners depending on the specific scenario. Partnership response is dependent on policies of the specific organization. WPP will provide partners with direction and guidance when requested. A Quality Assurance Project Plan (QAPP) and Standard Operating Procedure document was developed specifically for HABs response in SD (https://danr.sd.gov/dfta/wp/habs.aspx). The HABs response protocol addresses public recreation and livestock watering.

HABs Response Protocol

The HABs response protocol provides WPP and partners with a framework to effectively respond to public reports. Communication with the public can provide valuable information to direct an appropriate response. The response protocol includes a three-step process:

1) Information and evidence are collected through an interview process.
2) Scenario determination is made based on report information and/or investigation (i.e. CYAN).
3) Response issued based on specific scenario.

Three independent scenarios are recognized:

1) A HAB is not present: Bloom or biotic material is not toxin producing algae.
2) A HAB is evident: Report indicates no documented impacts to human or animal health.
3) A HAB is evident: report indicates impacts to humans or animals.

HABs response personnel need to be familiar with the protocol and have it available for quick reference. When a HAB report is received and a response issued, notify the HABs coordinator (Josh.Strobel@state.sd.us). The HABs coordinator will notify pertinent partners and file reports-supporting information internally (N: Watershed/HABs Response/HABs Reports) and update the HABs web map (https://danr.sd.gov/dfta/wp/habs.aspx).

Interview and Information Gathering

Initial communication with the Reporting Party (RP) should focus on information gathering. Ask the following questions and record the answers on the SD DENR HABs Report Form available in the HABs Standard Operating Procedures (HSOP) document or Appendix C of this document.

1. Determine RP's name.
2. Determine water body name and specific location of the potential bloom.
3. Determine water color? Clarity? Odor? and any other bloom characteristics. Ask for multiple pictures of the bloom. Pictures can emailed to DANRINTERNET@state.sd.us or Josh.Strobel@state.sd.us
4. Determine if humans and/or animals are experiencing symptoms of cyanotoxin exposure:

   Symptoms associated with Humans:

   - Skin irritation or rash.
   - Blistering around the mouth.
   - Ear, nose, and throat irritation
   - Dry cough, fever
   - Abdominal pain, nausea, vomiting, and diarrhea
   - Headache, numbness, paresthesia (pins and needles, tingling)
   - Drowsiness, incoherence

   Symptoms associated with Animals (pets, livestock, or wildlife):

   - Excessive salivation, difficulty breathing, vomiting
   - Diarrhea, seizures, death

Based on the results of the interview process determine the appropriate response scenario based on Recreation and/or livestock watering:

Scenario 1: HAB not present

The **i**nformation gained from the interview process CLEARLY indicates that toxin producing algae is not the source of the bloom and health impacts are not a concern. The most common causes of Scenario 1 are large quantities of duckweed, aquatic plants, or filamentous algae (moss). The following response is applicable to reports concerning recreation and livestock watering:

1. Inform the RP that the report indicates a HAB is **not** present.
2. Share WPPs HABs webpage for more information (https://danr.sd.gov/dfta/wp/habs.aspx). Share the phrase, **"When in doubt, stay out."**

If information gained from the interview process is inconclusive move to Scenario 2.

Scenario 2: No Immediate Health Impacts to Humans, Pets or Livestock

HAB is evident: Report indicates humans and/or animals are not displaying symptoms of cyanotoxin exposure though risk of toxin producing algae is a concern. The RP is likely inquiring about whether it is safe to recreate (i.e. swim) or water livestock.

Provide RP the following recreation-based response:

1. Inform that the only way to know if cyanotoxins are present is to test the bloom. Share the phrase, **"When in doubt, stay out."** Ask RP to inform others and pets to avoid the bloom.
2. Inform that a field investigation will be conducted to determine cyanotoxin levels. Results will be provided, when available, generally within 2-3 days (Follow up).

Internal Response:

1. HABs coordinator will notify GFP management, county specific emergency managers, pertinent water development district contacts and, if applicable, the lake association president.
2. The HABs coordinator will post an advisory on the HABs web map. Advisory will be updated when cyanotoxin results become available.
3. The HABs coordinator will collaborate with partners to determine a course of action (i.e. advisories-follow up monitoring) if cyanotoxin results indicate a concern level.

Provide RP the following Livestock watering-based response:

1. Recommend that livestock be restricted from the water source until the bloom has subsided. Encourage producer to inform neighbors to restrict livestock from the water source.
2. Inform producer that the only way to know if cyanotoxins are present is to test the bloom.
3. Inform producer that a field investigation will be conducted to determine cyanotoxin levels. Results will be provided, when available, generally within a 2-3 days (Follow up).
4. Refer producer to local county NRCS office for alternate water source program options.
5. Inform producer to contact the state veterinarian's office or SDSU vet extension if livestock develop symptoms of cyanotoxin exposure.

Internal Response:

1. HABs coordinator will notify state vets office and other pertinent partners.
2. HABs coordinator will post an advisory on the HABs web map. Advisory will be updated when cyanotoxins results become available.
3. The HABs coordinator will collaborate with partners to determine a course of action (i.e. advisories-follow up monitoring) if cyanotoxin results indicate a concern level.

Scenario 3: Health Impacts to Humans, Pets or Livestock

HAB is evident: Report indicates humans and/or animals are displaying symptoms of exposure to cyanotoxins.

Provide RP the following recreation-based response:

1. Inform RP to contact the state epidemiologist (DOH) for direction related to mild or moderate symptoms. If severe symptoms are reported (vomiting-cramping etc.) immediately direct RP to contact poison control (1-800-222-1222). In the case of pets, inform RP to contact local veterinarian and follow up with the state vet's office.

Internal Response:

1. The HABs coordinator will initiate a field investigation to document cyanotoxin levels.
2. The HABs coordinator will notify the state epidemiologist (DOH), GFP management, the county specific emergency manager, appropriate water development district and, if applicable, the lake association president.
3. The HABs coordinator will post an advisory on the HABs web map.
4. The HABs coordinator will update the HABs web map and all partners when cyanotoxin results become available, generally within 2-3 days.
5. The HABs coordinator will collaborate with partners to determine a course of action (i.e. advisories-follow up monitoring) if cyanotoxin results indicate a concern level.

Provide RP the following livestock watering-based response:

1. Inform the producer to contact the state veterinarian's office or SDSU vet extension to investigate livestock symptoms or dead animals (i.e. necropsy).
2. Inform producer that a field investigation will be conducted to determine cyanotoxin levels. Results will be provided, when available, generally within 2-3 days (Follow up).
3. Refer producer to local county NRCS office for USDA reimbursement programs for livestock cyanotoxin related death.

Internal Response:

1. The HABs coordinator will update the HABs web map and all partners when cyanotoxin results become available.
2. The HABs coordinator will collaborate with partners to determine a course of action (i.e. advisories-follow up monitoring) if cyanotoxin results indicate a concern level.

Field Investigation: Process and Procedures

Response field investigations will follow procedures described in the HABs Quality Assurance Protection Plan (QAPP) and Standard Operating Procedure documents developed by WPP and available on the HABs webpage (https://danr.sd.gov/dfta/wp/habs.aspx). In short, field investigations will utilize Abraxis test strips to determine microcystin range. If microcystin results fall within a concern level water samples will be collected for laboratory analysis. Cyanotoxin samples for field investigations will be sent to the EPA laboratory in Lakewood CO, for a full toxin panel analysis. In addition, WPP and partners

have integrated routine lake cyanotoxin monitoring in various projects and programs as part of the HABs assessment strategy.

Watershed Protection Program (WPP): HABs Assessment Strategy

Lake Cyanotoxin Monitoring

WPP has been monitoring water quality at approximately 140 lakes routinely for over 30 years. Lake monitoring has primarily focused on parameters related to eutrophication or productivity (i.e. nutrients-algae). A recent analysis showed that algae communities in many lakes are dominated by cyanobacteria especially in summer and early fall. Several toxin producing species have been identified at significant densities. The incidence of cyanobacteria dominated blooms is particularly common in glacial prairie pothole lakes east of the Missouri River though can occur in lakes statewide. Despite understanding cyanobacteria dominance, little is known about the prevalence and persistence of cyanotoxins associated with blooms. Integrating cyanotoxin sampling into lake monitoring projects and volunteer monitoring partnerships is a first step to understanding cyanotoxins in SD lakes.

The Watershed Protection Program (WPP) integrated cyanotoxin sampling into lake monitoring projects during the 2020 field season. The EPA Region VIII HABs team provided guidance and analytical support during the initial assessment effort. WPP plans to expand cyanotoxin monitoring in the 2021 field season and beyond to increase cyanotoxin data capacity. The objectives of HABs monitoring are to; 1) determine the prevalence of cyanotoxin in HAB prone lakes in SD and; 2) provide water resources mangers, public health officials and emergency managers with cyanotoxin data to inform decisions related to recreation use and public safety. The following provides a description of the HABs assessment strategy.

Statewide Lake Assessment Project

DENR staff will conduct cyanotoxin monitoring as part of the Statewide Lakes Assessment (SWLA) project (https://danr.sd.gov/dfta/wp/swla.aspx). Cyanotoxin monitoring will focus on lakes prone to cyanobacteria blooms as a subset of the lakes selected for routine monitoring (n=35 annually). Cyanotoxin sample collection will be conducted monthly during the field season at public beaches or public access areas (i.e. boat ramps). Additional composite samples will be collected from three basin sites consistent with the collection of nutrient-related water quality parameters (i.e. nutrients, chlorophyll-*a* and phytoplankton ID). Cyanotoxin monitoring will be conducted in accordance with annual project workplans following the HABS Quality Assurance Project Plan (QAPP) and HABS standard operating procedures (https://danr.sd.gov/dfta/wp/habs.aspx).

Rotating Basin Assessment Project

The Rotating Basins Assessment project (webpage coming soon) provides an outlet for cyanotoxin monitoring at HABs prone lakes during a two-year assessment window. East Dakota Water Development District (EDWDD) monitored cyanotoxin at HABs prone lakes during the 2020 field season. EDWDD plans to increase shoreline and composite cyanotoxin sampling during the 2021 field season. Subsequent assessments in the rotation will integrate HABs assessment going forward. For instance, James River Water Development District will sample cyanotoxin at select lakes during rotation 2 and 3 (i.e. 2022-2025). There is also potential for rotating basin partners to extend cyanotoxin monitoring at select lakes within district boundaries outside the scheduled rotating basin assessments. Cyanotoxin monitoring will

be conducted in accordance with annual project workplans following the HABS Quality Assurance Project Plan (QAPP) and HABS standard operating procedures (https://danr.sd.gov/dfta/wp/habs.aspx).

Volunteer Water Quality Monitoring Program

WPP is partnering with the Discovery Center in Pierre, SD to build a robust volunteer monitoring program. To date, most volunteer monitoring groups have integrated cyanotoxin monitoring into routine lake sampling plans. Volunteer monitoring groups include lake associations and private interest groups. Volunteer water quality monitoring personnel are required to follow guidelines described in the Volunteer QAPP (https://danr.sd.gov/Conservation/WatershedProtection/docs/volunteerqapp.pdf) to ensure the collection of high-quality data. The guidelines require volunteer monitoring groups to attend training provided by WPP staff. In addition, volunteer monitoring groups are required to pass a field audit prior to sampling. Data acceptance into the states surface water quality database is dependent on following QAPP guidelines. Volunteer monitors will collect a combination of shoreline and composite microcystin samples in accordance with independent monitoring workplans.

Game Fish and Parks Beach Monitoring

South Dakota GFP is the primary aquatic resource management agency in SD. GFP manages multiple lakes with public access areas (i.e. boat ramps-shoreline access) including parks and recreation areas with public swim beaches. WPP staff have and will continue to communicate with GFP management to encourage routine shoreline cyanotoxin monitoring particularly at public swim beaches. WPP will provide GFP with the tools and guidance necessary to implement beach monitoring to include interpretation of cyanotoxin results for advisory based decisions. WPP will also inform GFP management of all HAB reports and cyanotoxin results from statewide monitoring efforts immediately as they become available.

The cumulative cyanotoxin monitoring efforts are expected to collect 285 shoreline samples and 50 lake basin composite samples from lakes statewide during the 2021 HABs season (Table 2). This will include 68 duplicate and blank (i.e. QA/QC) samples required for precision and accuracy measures in accordance with the HABs QAPP. Baseline cyanotoxin samples will vary annually based on monitoring designs, resource availability and partnership participation.

Cyanotoxin Lab Analysis

EPA Region VIII has agreed to provide SD with indefinite cyanotoxin analytical support dependent on funding and annual laboratory demand. EPA allocated 75 cyanotoxin samples to SD in 2020 and 2021. Five of the seventy samples in the allocation are dedicated to lake or stream HABs response sampling. The remaining allocation (n=70) is dedicated to lake basin composite samples and QA/QC samples (10% duplicates and blanks) in accordance with the HABs QAPP. The collection of lake basin composites is consistent with WPPs lake monitoring design which intends to account for spatial variation in lake basins. WPP follows EPA guidance with respect to cyanotoxin sample collection, storage and shipping procedures (Appendices A and B). The EPA Region VIII laboratory in Lakewood, CO conducts an initial ELISA test for total microcystin and associated congeners and a full toxin screen using Liquid chromatography (LC/MS) in accordance with EPA approved methods. Results of the response samples are generally provided within a week of sampling while composite sample results are provided following the field season generally in mid-winter.

Additional cyanotoxin analysis was deemed necessary to cover cyanotoxin monitoring objectives above the EPA allocation (Table 2). The WPP HABs coordinator contacted several private labs to determine sample logistics and pricing for additional cyanotoxin sample analysis. Mid-West labs in Omaha, NE was selected as the best option. A decision was made to focus exclusively on microcystin due to costs associated with a full toxin screen. Samples will be shipped to the lab weekly and analytical results will be available within 2-3 days of collection. Receiving timely results is beneficial for the response component allowing WPP to inform partners and the public about the risks associated with existing blooms. Mid-West Labs will provide all necessary sample bottles, shipping coolers, labels and chain of custody forms in accordance with internal lab quality assurance measures. Analytical results will be generated using EPA approved methods and procedures.

2021 Sampling Budget

Table 2: Budget for 2021 Field Season Toxin Samples

	WPP Statewide Lakes Assessment	Rotating Basin (EDWDD)	Volunteer Monitoring
Shoreline Samples	72	120	30
Shoreline Cost	$2,880	$4,800	$1,200
Composite Samples	23	22	0
QA/QC Samples	19	29	6
QA/QC Costs	$760	$1,200	$240
Shipping	$216	$549	$90
Total Samples	91	171	30
Total Costs	$3,856	$6,549	$1,530

HABs Monitoring Results

All results generated from cyanotoxin monitoring efforts will be posted on Watershed Protection Program's HABs web map https://danr.sd.gov/dfta/wp/habs.aspx. The HABs web map will be updated soon after the results become available. An advisory will be posted when cyanotoxin results exceeded concern levels and partners will be notified following the HABs response protocol. Building annual and long-term cyanotoxin records for individual lakes is essential to achieving the monitoring objectives. Results will be summarized annually and presented to federal, state, and local partners to describe the magnitude of HABs in SD lakes. In addition, WPP will use annual results to make monitoring decisions for subsequent HABs seasons. The web map provides a forum for the public to view historic cyanotoxin results from lakes of interest to inform recreation-based decisions when immediate results are not available.

EPA's CyAN Imagery Application

EPA's CyAN application is an imagery-based modeling tool that can be used by water resource managers to inform HABs related decisions (https://www.epa.gov/water-research/cyanobacteria-assessment-network-mobile-application-cyan-app). The CyAN application provides weekly cyanobacteria cell count estimates for several larger lakes and reservoirs in SD. WPP plans to review weekly CyAN results to identify potential HABs lakes with cell counts greater than 100,000 cells. Results of the HABs imagery will be shared with all state and local partners to provide awareness and inform decisions. WPP will encourage partners to verify potential HABs events on lakes outside the monthly HABs monitoring

network using Abraxis test strips to quantify microcystin range. If the microcystin range exceeds concern levels, WPP will provide a sample bottle for immediate microcystin lab testing. All potential HABs results generated from the CyAN application and subsequent microcystin testing will be posted on WPPs HABs web map and shared with partners. CyAN results will also be used for HABs response field investigations to monitor blooms for follow up monitoring.

Appendix A

EPA Region 8 Laboratory
1 Denver Federal Center
Building 25, Entrance E-3
Lakewood, Colorado 80225

HAB

Sample Submission Form

Instructions: Fill out the station ID, station description, date and time in the chain of custody section (the bottle ID column is for lab use only). Print and sign your name and date the sampler block. Note discrepancies to the sampling/shipping protocols or additional information that may be pertinent in the comments block (backside).

Chain of Custody

Waterbody:		**LSRW:**		
Station ID	**Station Description**	**Date**	**Time**	**Bottle ID (lab)**
				U:
				P:
				U:
				P:
				U:
				P:
				U:
				P:
				U:
				P:

Samples are algal toxin (LC-MS/MS and ELISA) (one unpreserved (U) and one preserved (P) 30 mL PETG container per station, water matrix. Preservative is 10x sample diluent concentrate. All samples are kept on ice in the dark. Note any discrepancies or deviations to this statement in the comments section.

Sampler Name:	**Signature:**	**Date and time:**	
Received by Name:	**Signature:**	**Date and time:**	**Cooler Temp (°C):**

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Lakewood, Colorado 80225

Field Conditions

Waterbody:	**LSR#:**

Field conditions: note overall waterbody (surface conditions, color, algal mats, odor, etc.) and weather (precipitation, air temp, cloud cover, wind speed/direction) conditions in the respective blocks. Insert any additional comments that may be relevant in the comments section. For the station specific conditions follow the same guidance as overall waterbody conditions but specific to the sampling site. If collected, enter max and secchi depth, pH, DO, SC, water temp in these sections.

Weather:

Overall Lake conditions:

Station specific conditions (enter secchi/max depth, pH, temp, SC, DO if collected):

ID:	
ID:	
ID:	
ID:	
ID:	

Additional comments:

Appendix B

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Building 25, Entrance E-3
Lakewood, Colorado 80225

Emergency Bloom /Toxin Only

Algal Toxin Sample Collection and Shipment Quick Reference Guide

Cooler kit contents:

- Cooler
- 5 prelabeled ~~50~~ 60 mL PETG bottle sets
- 5 squares of tinfoil
- 5 pair of large gloves
- 1 gallon Ziploc bag
- 1 Chain of custody form
- 1 Prefilled FedEx form and envelope
- 1 Algal toxin quick reference guide (this form)

Sample Site selection: Collect samples at up to five samples. Sample locations can vary by waterbody, but typically the following sites should be considered:

- Index (deepest part or center of the lake)
- Public access areas (beaches, boat ramps, marinas, etc.)
- Leeward shores (downwind side of lake)
- Location of the most obvious bloom/area of concern
- Near drinking water intakes (if drinking water supply)
- Raw and finished water supplies (drinking water only)

Sample Collection: Fill the cooler with ice and label bottles prior to sample collection. Create sample IDs that will be easy to associate with sample locations. Samples are typically taken just below the surface of the water or at 0.5 meters depth. Fill the sample vessel approximately 2/3 full of sample water. Wrap the sample vessel in foil to prevent light exposure and place on ice.

Chain of Custody Sample form: Complete the chain of custody form by filling out the station ID, station description, time, and date. Sign and date the sampler block.

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Lakewood, Colorado 80225

Sample storage:

1. Keep samples on ice or refrigerated in the dark
   a. If samples are being shipped the day of sample collection keep in the dark on ice until shipment.
   b. If samples are being held overnight, keep frozen by placing in a freezer or on dry ice until ready for shipment.

Sample shipment:

1. Place samples in cooler.
2. Ice cooler (refresh ice if already on ice).
3. Seal the chain of custody form in a ziploc bag and place on top of the ice and samples.
4. Tape cooler shut.
5. Affix shipping label sleeve to the top of the cooler
6. Add sender information to the label and insert label into the pouch.
7. Schedule overnight express delivery of samples. At FedEx.com or by calling 1-800-463-3339 (1-800-GOFEDEX)
8. Call and/or email the laboratory contact that shipped the cooler to let them know the coolers have shipped.
   Lab contact information:
   Marcie Tidd: tidd.marcie@epa.gov, Phone: 303-462-9476
   Mark Murphy: murphy.mark@epa.gov, Phone: 303-462-9474

Appendix C

SD DANR HABs Call Report Form

Issued To: [Your Name] Date:

Reporting Party: [Callers Name] Time:

Waterbody/Location: [coordinates, name, address, legal description, swim beach or state park)

Highlight or Mark Yes/No and Write Additional Comments Below Question

Is the water an unusual color? YES/NO

Odor Present? YES/NO

Are pictures available? YES/NO

Have any people or animals been in the water? YES/NO

Is any person or animal showing symptoms? YES/NO

Additional Comments

SD DANR HABs Site Visit Form

Samplers Name:

Reporting Party:

Location: [Waterbody, Long/Lat]

Site Observations

Photos:

Air Temperature:

Wind Speed/Direction:

Water Color:

Odor Present:

Sample Collection (cyanotoxin, algae ID traditional and/or eDNA, CHLa)

Sample Location [Beach, Boat Ramp]:

Sample Time:

Sample Date:

YSI Parameters

Conductivity:

pH:

DO:

Water Temperature:

Additional Comments

SD DANR HABs Photo Permission Form

I Print _____ Name hereby (GRANT)/(DENY) permission to the South Dakota Depament of Environment and Natural Resources to access and collect photos of evidence from a HABs event.

Please fill in the following:

- Date of HABs event: _____
- Date when/if symptom was observed: _____
- Location/Address: _____

If you have any specific information about this event that you would like us to know, please explain below:

_____

_____

_____

_____

_____

Signature: Date: